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Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children

(2) Calculate the risk of an elevated blood lead level for the replacement of soil lead with soil having a lower lead concentration, along with cleaning up household dust;

The first scenario describes risk to occupants with present exposure levels. The second scenario describes risk to occupants in the distant future after lower new lead levels have been achieved by abatement. The IEUBK model can accept input data describing both of these exposure scenarios.

2.3.4.1 Soil and Dust Lead Default Exposure Parameters

The natural concentration of lead in soil, from weathering of crustal materials, is estimated as about 10 to 25 μg/g. A plausible urban background is 75 to 200 μg/g (U.S. Environmental Protection Agency, 1989a; HUD, 1990).

It is expected that lead concentrations in undisturbed soils may persist for many thousands of years. However, urban areas are hardly undisturbed environments and available data (von Lindern, 1991; Jacobs Engineering, 1990) suggest that near-surface soil lead concentrations may decrease by a few percent over a decade or so. It is usually adequate to assume a constant soil lead concentration unless soil abatement is included in the exposure scenario.

It is also possible that the soil becomes recontaminated over time, for example if surface soil is abated and then is recontaminated by ongoing atmospheric lead deposition from non-abated sites near by or by contamination from deteriorating exterior lead-based paint. Changes in soil concentration can be incorporated on an annual basis in developing the exposure scenario. This is done with the Option "2" on the Soil/Dust Data Entry Menu.

2.3.4.2 Exposure to Soil and Dust

The default value for total intake of soil and dust depends on age, and ranges from 85 to 135 mg/day. These values are within the ranges identified in the OAQPS staff paper that supported the first UBK model and have been reviewed by the EPA Clean Air Science Advisory Committee. Recent investigations by Binder et al. (1986), Clausing et al. (1987), Calabrese et al. (1989, 1991b), van Wijnen et al. (1990), and Davis et al. (1990) apply the trace element approach to quantify ingestion rate. These investigations currently constitute the most appropriate basis for estimating the quantity of soil ingested. The results are summarized in Table 2-6. The van Wijnen et al. data are discussed in Section 2.3.4.4. It is likely that the intake rate depends on the child's age, activity pattern, and the total